AOARD REPORT

Visit of the Korea Advanced Institute Science and Technology (KAIST)

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AOARD

South Korea's Korea Advanced Institute of Science and Technology (KAIST) was visited on 28 June 94. The intent of the visit was to learn about basic and advanced research activities carried out at KAIST and make initial contacts with KAIST personnel for any future international collaborative research programs which are of mutual interest to both the US Air Force and KAIST. KAIST is Korea's premier technical institute for providing both the undergraduate and graduate degrees in science and engineering. Many faculty members have obtained their PhDs in the U.S. and they are more than willing to set up joint collaborative research programs with the US Air Force.

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I. Introduction

As part of assessing South Korea's scientific research activity, four scientists of the Asian Office of Aerospace Research and Development (AOARD), consisting of Dr Fujishiro, Dr Tom Davis, Air Force Capt Paul McQuay and myself, visited the Korea Advanced Institute of Science and Technology (KAIST), located in Taejon, about 100 miles south of Seoul and about 200 miles northwest of Pusan on 28 June1994. With the help of Mr F. Kenneth Crosher, Science Counselor of the U.S. Embassy in Seoul, we made arrangements to visit KAIST a month before we left Japan for Korea. U.S. Air Force Major M. Burke of JUSMAG-K, the Joint U.S. Military Assistance Group - Korea, provided the transportation and accompanied us for the visit. At KAIST, we met Prof Myung Joong Youn, who holds multiple academic posts as dean of the Research Affairs, director of the Administrative Affairs and professor of the Electrical Engineering Department, Prof Seung-O Park, chairman and professor of the Aerospace Engineering Department, and Prof Jin Hyung Kim, chairman and professor of the Computer Science Department.

Shown below are contact points for anybody interested in getting touch with the above KAIST professors.

Name (Professor)	Telephone	Facsimile	E-Mail Address
Myung Joong Youn	+82-42-869-2005	xxx-2280	mmyoun@eekaist.kaist.ac.kr
Seung-O Park	+82-42-869-3713	xxx-3710	sopark@convex.kaist.ac.kr
Jin Hyung Kim	+82-42-869-3517	xxx-3510	jkim@cs.kaist.ac.kr

We spent two hours at KAIST based on the schedule shown below.

Tuesday, June 28, 1994

1400 - 1430 Meeting with Dr Myung Joon Youn
(Originally, scheduled to meet Dr Shin Sung-Chul, Director of International Relations)
1430 - 1500 Slide Presentation on KAIST
1500 - 1530 Meeting with Dr Seung-O Park
1530 - 1600 Meeting with Dr Jin-Hyung Kim

We had very informative discussions with KAIST professors during only two hours of our stay. The following are some interesting points about KAIST which I got out of the visit.

II. Facts about KAIST

KAIST, established by the Ministry of Science and Technology (MOST) as a graduate university in 1971 and merged with the undergraduate school of the Korea Institute of Technology (KIT) in 1988, became a fully accredit educational institute, focusing solely on educational training in science and engineering fields. KAIST is unique, as compared with other Korean universities, in the sense that it is the only technical university which does not come under the stingy bureaucratic control of the Ministry of Education. The total operational budget in 1994 accounted for approximately $US 59 million, supporting a total of 836 personnel which consisted of 338 professors, 56 researchers and teaching assistants, 259 administrative staff, and 183 technical staff. KAIST has two campuses,

with the main campus (1,104,411 square meters) located inside Daeduk Science Town, Taejon and the Seoul campus (109,787 square meters) located at 207-43 Cheongryangri-Dong, Dongdaemum-ku, Seoul 130-012. KAIST colleges and instructional units are consisted of six schools and 22 departments, covering all the science and engineering disciplines. A total enrollment of students for 1994 is 5,677, divided into 2,475 BS, 1,236 MS, and 1,966 Ph.D. students. The percentage of female students accounted for only 3% of the total student body. Every year, KAIST admits 558 for BS, 591 for MS and 394 Ph.D. students. The academic year is divided into two semesters, with the first semester starting 1 March and ending 31 August and the second semester starting 1 September and ending 28 February.

Since its establishment in 1971, KAIST has carried out a total of 6,849 research projects valued at approximately $US 150 million. In 1993 alone, the total research funds added up to approximately $US 41 million with most of the funding support coming from Korean industries. Because of the increased emphasis in science and technology in recent years, industry-funded university projects have been on the increase every year. The industrial connection of the university projects can be seen readily by the following list of completed projects.

- Small Satellite for Science and Technology Experiment (Uribyol 1,2)
- Semiconductor Leadframe Material and Its Manufacturing Technology (PCM-102), which provides an essential part of semiconductor used in computers, telecommunication equipment, the latest electronics goods, and consumer electronic goods like TV, VCR, etc.
- 3D CAM S/W System (SWEEP)
- Fuzzy Computer
- Artificial Intelligent Mobile Robot (CAIR-2), which includes applications in factory automation, cargo transportation, machine-driven tractor and atomic power plants, tasks in military defense and space exploration.
- Ultrasonic Medical Imaging System
- Weldable High Strength Aluminum Alloy.

As a result of close ties with industry, KAIST has formed collaborative research programs with many industrial research institutions in order to promote a mutual awareness between industrial and academic research and also to provide opportunities for students to actually participate in many industry-critical technology projects.

The quality of education at KAIST seems to be a first class as explained in an article which appeared in Vol 364 of the NATURE magazine, dated 29 July 1993. It make the statement that "KAIST is a first quality institute with high calibre programmes and students who are will qualified, aggressive... and highly motivated. With an increase in government support, KAIST has the potential for becoming one of the top institutions in the world." To achieve the world reputation, KAIST recruited top quality scientists, mostly of the Korean origin, from the U.S. The list of universities where the present faculty members obtained their postgraduate degrees reads like a roster of the best U.S. research institutes, such as MIT, Caltech, Princeton, Stanford and Harvard to name a few. Professors Seung-O Park and Jin Hyung Kim, who we met during our visit, were of no exception. They obtained their Ph.Ds from Iowa State University and UCLA, respectively. Many of these faculty members spent a few years working in the US industry and they are very much aware of the U.S. style education and training.

III. Discussions with Chairmen of Aerospace Engineering and Computer Science Departments

We had thirty minutes each to discuss programs of Aerospace Engineering and Computer Science Departments, respectively, with Professors Seung-O Park and Jin Hyung Kim. After we briefed them of our program, both Professors Park and Kim gave us the department booklets, which described research interests of their faculty members, curriculums, and research projects of the department, to discuss programs and activity of their respective department. The booklets contained good information about types of research being carried out by various professors.

It is interesting to find out that these departments have very close working relationships with government run research institutes such as the Korean Aerospace Research Institute for the Aerospace Engineering Department and the Systems Engineering Research Institute. There have many on going research projects with these institutes in support of the government projects like the HAN projects.
for the Computer Science Department.

According to the department booklet (dated 1990), the Aerospace Engineering Department has nine faculty members in charge of 38 MS and 42 PhD students. Research interests of the department ranges from aerodynamics, Structures and materials, propulsion and combustion, and flight mechanics and control.

For the Computer Science Department, there are 21 faculty members in charge of about 200 undergraduate and 271 graduate students Research interests of the department include parallel architecture and processing, artificial intelligence, system engineering, algorithm designs, neural network, speech recognition and processing, and real time processing.

IV. Summary and Comments

KAIST is trying hard to catch up to the rest of the world-class academic institutions. Whether it is good or not, since its 1981 founding, KAIST took the strategy of recruiting the top quality Korean scientists, especially from the U.S., to set up strong academic curriculums to train students in science and engineering. During our visit to KAIST, all the professors we met graduated from US universities. These are professors who are currently in positions to make decisions to influence the future of the university. Because of their experience in the US, I felt the management style of KAIST is becoming akin to that of the US universities.

KAIST has many research projects supported by Korean industry. The close industrial affiliation is helping many students to expand their technical skills in the applied research area and make aware of the roles of academic and industrial research. I would expect not in the far future KAIST graduates will play an important role in leading Korea industry to compete against US and Japanese companies.